Appendix A – Opinion Of The United States Court Of Appeals For The Federal Circuit, Dated And Filed June 1, 2000

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United States Court of Appeals for the Federal Circuit

99-1358

TA INSTRUMENTS, INC.,

Plaintiff-Appellee,

v.

THE PERKIN-ELMER CORPORATION,

Defendant-Appellant.

DECIDED: June 1, 2000

Before MAYER, Chief Judge, SCHALL, and GAJARSA, Circuit Judges.

SCHALL, Circuit Judge.

DECISION

The Perkin-Elmer Corporation ("Perkin-Elmer") appeals from the final judgment of the United States District Court for the District of Delaware that granted TA Instruments, Inc.'s ("TA's") motion for judgment as a matter law ("JMOL") that Perkin-Elmer infringed claim 17 of U.S. Patent No. 5,224,755 ("the '775 patent"), claims 1, 11, 21, 37 and 41 of U.S. Patent No. 5,346,306 ("the '306 patent"), and claim 73 of U.S. Patent No. 5,439,291 ("the '291 patent")[1] either literally or under the doctrine of equivalents, and that claim 73 of the '291 patent is valid. See TA Instrs.. Inc. v. Perkin-Elmer Corp., 99-545 (Apr. 6, 1999) (Final Judgment). Perkin-Elmer also appeals the district court's conditional grant of TA's motion for a new trial on the issues of infringement, obviousness, and willfulness. See id. On its counter-claim, Perkin-Elmer appeals the district court's final judgment that TA does not infringe U.S. Patent No. 4,246,641 ("the Babil patent"). See id.

With respect to the Reading patents, we affirm the district court's grant of JMOL to the extent that it held the claims to be infringed under the doctrine of equivalents and held claim

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1 These patents are referred to collectively as "the Reading patents."

73 to be valid. We vacate the district court's grant of a new trial on the issue of willfulness. Because the district court's grant of a new trial on the issues of infringement and obviousness was conditioned on a reversal of the JMOL, we do not address this conditional grant. With respect to the Babil patent, we vacate the district court's judgment of noninfringement and remand the case to the district court for further proceedings in accordance with this opinion.

I.

DISCUSSION

TA, the assignee of the Reading patents, sued Perkin-Elmer for infringement of claim 17 of the '755 patent, claims 1, 11, 21, 26, 37 and 41 of the '306 patent, and claims 11, 38, 73 and 88 of the '291 patent.[2] Perkin-Elmer, the assignee of the Babil patent, counter-claimed for infringement of claim 1 of the Babil patent. We first address Perkin-Elmer's appeal with respect to the Reading patents.

A. The Reading Patents

The inventions of the Reading patents are directed to differential analysis. As described in

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[2] The Reading patents are related as parent (the '775 patent), continuation (the '306 patent) and continuation-in-part (the '291 patent).

the patents, this technology measures the changes in a physical property (the "characterizing differential physical parameter") of a sample material in response to a change in some physical factor (the "driving variable"), such as temperature, pressure, or applied stress. See, e.g., '775 pat., col. 1, l. 55 - col. 3, l. 11. The resulting data is used to obtain information about the material. Although the patents contain broad language as to the physical property that can be measured and the physical factor that can be changed, the accused device and prior art measure changes in the same physical property-heat flow to and from the sample-in response to changes in the same physical factor-temperature. This type of differential analysis may yield, for example, information about the material's heat capacity.[3] It is referred to as differential scanning calorimetry ("DSC"). In some applications of DSC, the changes in heat flow to and from the sample material are compared to changes in heat flow to and from a reference material, where the reference material is also subject to a change in temperature.

The parties focus on two aspects of the DSC methods claimed in the Reading patents: the way in which the temperature is changed and the way

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[3] A material's heat capacity reflects the quantity of heat required to raise the material's temperature See Webster's Third New Internat'l Dictionary 1046 (1986).

in which the resulting data is processed to obtain information about the material. Conventional DSC methods change the temperature at a constant rate, according to a linear temperature ramp (if temperature is plotted against time, an upwardly sloping line results). In contrast, the DSC methods of the Reading patents add an oscillating heating rate to a linear temperature ramp (if temperature is plotted against time, an upwardly sloping, oscillating curve results). The '775 and '306 patents describe their temperature program as "a rapid heating oscillation . . . added to a conventional linear temperature ramp." Id. at col. 4, II. 14-16; '306 pat., col. 4., II. 18-20. The two patents describe the preferred embodiment as comprising the steps of selecting the underlying heating rate (the linear temperature ramp), selecting the modulation frequency and modulation amplitude (the frequency and period of the oscillating heating rate), and applying a modulation with the selected frequency and amplitude to the underlying heating rate (achieving a temperature program that follows an upwardly sloping, oscillating curve). See '775 pat., col. 8, II. 25-30; '306 pat., col. 8., II. 25-32. The '291 patent describes the preferred heating program as exposing the sample material "to both an oscillating heating rate component and a constant heating rate component." '291 pat., col. 5, II. 29-31.[4]

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[4] The '291 patent also incorporates the '775

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The Reading patents teach that the heat flow data can be processed to "deconvolute" the data into two or more components. The '306 patent defines deconvolution as follows:

> "Deconvolution", as used herein, means the process of separating the dependence of a characterizing physical parameter such as total heat flow on temperature into two or more component parts so that the component parts can be utilized or analyzed separately, or compared with each other. For example, the dependence of the total heat flow can be deconvoluted into rapidly reversible heat flow and non-rapidly reversible heat flow components.

'306 pat., col. 3., II. 40-47. A similar definition is set forth in the '775 and '291 patents. See '775 pat., col. 3, II. 37-44; '291 pat., col. 4, II. 23-31. The Reading patents exemplify deconvolution as separating the data (i.e., the change in heat flow to and from the sample in response to changes in temperature) into a rapidly reversible component and a non-rapidly reversible component. The rapidly reversible component is dependent on the rate of change of the temperature of the sample

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and '306 patents by reference. See '291 pat., col. 1, II. 5-11.

material ("the rate of change of the driving variable") whereas the non-rapidly reversible component is dependent on the actual temperature of the sample material ("the value of the driving variable"). See '775 pat., col. 3, II. 12-36. The '775 patent teaches that this ability to deconvolute data is important when rapidly reversible and non-rapidly reversible events occur at the same or overlapping times, and permits the study of events which occur at the same temperature. See id. at col. 5, II. 15-18. Deconvolution is achieved by applying certain mathematical functions to the heat flow data. See id. at col. 4, II. 26-43.

Claims 1 and 37 of the '306 patent are representative of the asserted claims of the Reading patents:

> 1. A method for analyzing a material using a differential scanning calorimeter comprising the steps of:
>
> (a) selecting an underlying heating rate, modulation frequency and modulation amplitude;
>
> (b) placing a sample of the material in the differential scanning calorimeter;
>
> (c) varying the temperature of the sample in the differential scanning calorimeter according to the selected underlying heating rate, the selected modulation frequency and the selected modulation amplitude;

(d) recording a signal representative of differential changes in the heat flow to and from the sample; and

(e) deconvoluting the signal representative of differential changes in the heat flow to and from the sample to compute at least one deconvoluted signal.

37. A method for analyzing a material using a differential scanning calorimeter comprising the steps of:

(a) selecting an underlying heating rate, modulation frequency and modulation amplitude;

(b) placing a sample of the material in the differential scanning calorimeter;

(c) varying the temperature of the sample in the differential scanning calorimeter according to the selected underlying heating rate, the selected modulation frequency and the selected modulation amplitude; .

(d) recording a signal representative of differential changes in the heat flow to and from the sample; and

(e) deconvoluting the signal representative of differential changes in the heat flow to and from the sample to compute two deconvoluted signals.

Claim 73 of the '291 patent is the only claim the jury found to be infringed:

> 73. A method for analyzing a material using a differential scanning calorimeter comprising the steps of:
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> (a) selecting an underlying heating rate, modulation frequency and modulation amplitude;
>
> (b) placing a sample of the material in the differential scanning calorimeter;
>
> (c) varying the temperature of the sample in the differential scanning calorimeter according to the selected underlying heating rate, the selected modulation frequency and the selected modulation amplitude;
>
> (d) recording a signal representative of differential changes in the heat flow to and from the sample;
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> (e) storing the differential signal representative of the heat flow as heat flow data, said heat flow data forming a heat flow data set;
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> (i) separating the dependence of the heat flow data set on temperature into at least one component data set; and

(j) plotting said at least one component data set on an output device.

B. The Accused Device

The accused device is Perkin-Elmer's Dynamic Differential Scanning Calorimeter ("DDSC"). The DDSC uses a temperature program that Perkin-Elmer describes as a sequential combination of a short linear ramp (where the temperature is steadily increasing) and an isotherm (where the temperature is constant). When the temperature of this program is plotted against time, an upwardly sloping, zig-zag line results. In operation, the operator selects a starting temperature ("T1"), an ending temperature ("T2"), and the time ("t") that the device will take to reach T2 from T1 and will remain at T2 before heating to the next temperature. The device uses this information to generate a control signal for the temperature program. The device applies a filter to the control signal to eliminate irregularities. In order to preserve the zig-zag shape of the temperature program, the device separates the control signal for the temperature program into two component signals and applies the filter to only one of the signals. Specifically, the device separates the control signal into a ramp signal, where the ramp represents the average heating rate of the temperature program, and a sawtooth waveform signal, where the sawtooth waveform has the same frequency and amplitude as the zig-zags of the temperature program. The ramp signal is filtered and then combined with the sawtooth

waveform signal to generate the zig-zag temperature program. The DDSC produces two signals that can be evaluated and compared.

Perkin-Elmer admits that "elements (b), (d), (e), (i) and (j)" of claim 73 of the '291 patent "are clearly present in the use of the accused equipment." Brief for Appellant at 26, n.11. These elements are:

> (b) placing a sample of the material in the differential scanning calorimeter;
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> (d) recording a signal representative of differential changes in the heat flow to and from the sample;
>
> (e) storing the differential signal representative of the heat flow as heat flow data, said heat flow data forming a heat flow data set;
>
> (i) separating the dependence of the heat flow data set on temperature into at least one component data set; and
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> (j) plotting said at least one component data set on an output device.

II.

Perkin-Elmer's infringement of the Reading patents was tried to a jury. The district court construed the claims with respect to the selection of the temperature program and with respect to

deconvolution. The following claim construction was provided to the jury:

> The selection, means for selection, or preselection of . . . [required] temperature program parameters can be accomplished through any combination of computer hardware, computer software, or operator control. The claims of TA's patents do not require a specific user of equipment to specifically choose the underlying heating rate, modulation frequency, and modulation amplitude. Selection may be accomplished, in whole or in part, through programming of the computer and the equipment. There is nothing in the specification or the claim language which limits the selection process or means for selecting to any particular temporal or physical format. The temperature program defined by the selected underlying heating rate, modulation frequency, and modulation amplitude must be applied to the sample material in order to produce deconvoluted data.

Trial Tr. at 2620-21.

> Claim 17 of the '775 patent, Claims 1, 11, 21, 26, 37 and 41 of the '306 patent, and Claims 11 and 38 of the '291 patent use the term "decon-

voluting." You should understand "deconvoluting" according to its definition in the patents, as set forth in column 3, lines 40 through 47, of the '306 patent and column 4, lines 23 through 26, of the '291 patent. The same definition is used in each of the patents. That definition is:

> "Deconvolution", as used herein, means the process of separating the dependence of a characterizing physical parameter such as total heat flow on temperature into two or more component parts so that the component parts can be utilized or analyzed separately, or compared with each other. For example, the dependence of the total heat flow can be deconvoluted into rapidly reversible heat flow and non-rapidly reversible heat flow components.

The driving variable in a DSC instrument is temperature. The term "characterizing physical parameter" is separately defined in the patents in column 3, lines 10 through 14, of the

'306 patent, and at column 3, lines 58 through 62, of the '291 patent.

The same definition is used in both patents. That definition is: "Characterizing differential physical parameter", as used herein, means the dependent differential physical parameter characterizing the sample, such as its heat flow, weight change, or change in dielectric or mechanical properties.

One characterizing differential physical parameter in a DSC instrument is the heat flow to the sample with respect to the reference that characterizes the sample.

In sum, the claims require that a signal representative of differential changes in the heat flow to and from the sample be separated into two or more component parts, and that the component parts can be identifiable for separate analysis.

Trial Tr. at 2621-22.

The jury found that the asserted claims of the '755 and '306 patents were not infringed, either literally or under the doctrine of equivalents. The jury also found that these claims were not invalid for failing to satisfy the best mode requirement, were not anticipated by Mraw, J.

Chem. Thermodynamics 11: 567-84 (1979) ("Mraw"), and were not obvious. The jury found that claim 73 of the '291 patent was infringed under the doctrine of equivalents; was not invalid for failing to satisfy the best mode requirement, was not anticipated by Mraw, but was obvious. The jury found that Perkin-Elmer's infringement of claim 73 of the '291 patent was not willful.

Both parties had moved for directed verdicts before the case was submitted to the jury, but the district court reserved judgment on the motions. See Trial Tr. at 127374, 2082-83. After the jury reached its verdict, only TA renewed its JMOL. TA's JMOL sought a judgment that Perkin-Elmer infringed claim 17 of the '775 patent and claims 1, 11, 21, 37 and 41 of the '306 patent, both literally and under the doctrine of equivalents, that Perkin-Elmer literally infringed claim 73 of the '291 patent, and that claim 73 of the '291 patent is not invalid as obvious in view of the prior art.

The court granted TA's motion. See TA Instrs Inc. v. Perkin-Elmer Corp., 95-545, slip op. at 20 (Dec. 7, 1998) (Opinion). The court began with the jury's finding that claim 73 of the '291 patent was infringed, stating that it was required to adopt a view of the case that was consistent with the jury verdict. See id., slip op. at 5 & 7 n.2. The court turned first to claims 1 and 37 of the '306 patent. See id., slip op. at 5. The court noted that elements (a) - (d) of claim 73 of the '291 patent are identical to elements (a) - (d) of claims

1 and 37 of the '306 patent. See id., slip op. at 6. The court therefore determined that it had to assume that the accused device meets elements (a) - (d) of claims 1 and 37 of the '306 patent. See id., slip op. at 6-7. The court then noted that one difference between claim 73 and the other claims is that claim 73 does not recite "deconvoluting." See id., slip op. at 7. From this observation, the court concluded that the jury's different findings on infringement had to be attributed to "deconvolution." See id. The court thus framed the issue before it as whether there was substantial evidence to support the jury's implicit finding that the accused device did not "deconvolute." See id., slip op. at 8.

The court considered the evidence in the light of its construction of the term "deconvolution." Doing so, the court determined that the evidence indicated that the accused device did "deconvolute," that there was no evidence that would support a conclusion that it did riot "deconvolute," and that no reasonable jury could have found noninfringement with respect to claims 1 and 37 of the '306 patent. See id., slip op. at 13-14. Perkin-Elmer had argued that the court's definition of "deconvolution" required that the modulated temperature program be "applied to the sample," and that the jury must have found that the accused device did not "deconvolute" because it had found that the accused device did not apply a modulated temperature program to the sample. The court determined that this argument was not consistent with the jury's finding of

infringement of claim 7 3, because claim 73 recites the selection of the parameters of a modulated temperature program and the application of that program to the sample. See id., slip op. at 12. The court therefore determined that the "applied to the sample" language in the jury instructions could not have been the basis of the verdict of noninfringement. See id.

The court concluded that the jury's verdict that claim 73 of the '291 patent was infringed was consistent with a finding that the limitations of claim 17 of the '775 patent, claims 1, 11, 21, 37 and 41 of the '306 patent, and claim 73 of the '291 patent were met by the accused device. See id., slip op. at 14. Accordingly, the court granted TA's renewed JMOL as to the infringement of these claims.

The court then turned to the validity of claim 73 in view of the Mraw reference. The court determined that there was no substantial evidence to support the jury's finding that Mraw taught element (i) of claim 73, "separating the dependence of the heat flow data set on temperature into at least one component data set." See id., slip op. at 19-20. The court therefore concluded that the record did not support the verdict of invalidity, and granted TA's JMOL that claim 73 is valid. See id.

The court conditionally granted TA's motion for a new trial on the issues of infringement and obviousness if its grant of JMOL were reversed;

however, it did not set forth any reasons for this conditional grant. See id., slip op. at 20. The court also granted TA's motion for a new trial on the issues of willfulness and damages, conditioned upon its grant of JMOL being affirmed. The court explained this conditional grant as being "warranted given the court's conclusions regarding the issues of infringement and validity." See id. The court recognized that the jury had considered whether claim 73 of the '291 patent was willfully infringed, but determined that the jury should not have reached the issue in view of its finding that the claim was invalid. See id., slip op. at 20-21 n.10. The court concluded that because the jury's finding on willfulness was predicated "on conclusions concerning infringement and obviousness which conflict with those of the court[]," a new trial on that issue was warranted. See id.

Perkin-Elmer appeals from the district court's grant of TA's JMOL request and from its conditional grants of new trials. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

III.

We note at the outset that Perkin-Elmer is precluded from challenging the jury verdict as to the infringement of claim 73 of the '291 patent because it failed to renew its JMOL after the jury returned its verdict. Perkin-Elmer argues that because the district court reserved judgment on its pre-verdict motion and effectively ruled on its motion post-verdict when it granted TA's motion,

its pre-verdict motion should be given the same effect as if it had been made post-verdict, citing Biodex Corp. v. Loredan Biomedical, Inc., 946 F.2d 850, 20 USPQ2d 1252 (Fed. Cir. 1991). TA responds that Biodex stands for the proposition that failure to make a post-verdict motion precludes appellate review of the sufficiency of the evidence supporting a jury verdict. TA argues that, under Biodex, Perkin-Elmer's failure to make a post-verdict motion precludes its ability to challenge the jury verdict on appeal.

In Biodex, we stated that "we cannot review the sufficiency of the evidence after a jury verdict absent some post-verdict disposition, either by a deferred ruling or upon a post-verdict motion." Id. at 862, 20 USPQ2d at 1261. Although the district court deferred ruling on Perkin-Elmer's pre-verdict motion, it never made a post-verdict ruling on the motion. Accordingly, we are precluded from reviewing the sufficiency of the evidence supporting the jury verdict that claim 73 was infringed under the doctrine of equivalents.

Perkin-Elmer tries to avoid this result by arguing that it is challenging the legal sufficiency of the jury verdict, not its factual underpinnings. Specifically, it contends that the issue of infringement under the doctrine of equivalents should not have been presented to the jury because there was a complete lack of proof on that issue. This argument, however, challenges the sufficiency of the evidence, and requires us to review the record for substantial evidence of

infringement under the doctrine of equivalents. See, e.g., Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182, 1188-89, 48 USPQ2d 1001, 1006-08 (Fed. Cir. 1998) (addressing the appellant's argument that the evidence of record was legally insufficient proof of infringement under the doctrine of equivalents by determining whether there was substantial evidence to support a jury verdict to that effect). Thus, the presentation of doctrine of equivalents type evidence is not a pure issue of law that can be reviewed in the absence of a post-verdict ruling on Perkin-Elmer's JMOL.

We review a district court's grant of JMOL de novo, applying the same standard as the district court. See Markman v. Westview Instrs., Inc., 52 F.3d 967, 975, 34 USPQ2d 1321, 1326 (Fed. Cir. 1995) (en banc), affd, 116 S. Ct. 1384 (1996). We will affirm a grant of JMOL only if we find that the jury verdict was not supported by substantial evidence. See id.

A. Infringement

Perkin-Elmer argues that the district court's grant of JMOL of infringement with respect to claim 17 of the '775 patent and claims 1, 11, 21, 37 and 41 of the '306 patent was erroneous because the verdicts as to the infringement of claim 73 of the '291 patent and the noninfringement of the claims of the '775 and '306 patents can be reconciled. It argues that the jury could have found claim 73 to be infringed and the other claims not to be infringed because claim 73 re-

cites "separating" the data, whereas the other claims recite "deconvoluting" data. Perkin-Elmer argues that the district court's claim construction, set forth in its jury instructions, imposed a requirement on "deconvoluting" that it did not impose on "separating." Specifically, Perkin-Elmer argues that the court's claim construction required that the temperature program defined by the selected underlying heating rate, modulation frequency, and modulation amplitude be applied to the sample in order for deconvolution to be possible. Because this claim construction renders the other claims narrower than claim 73, Perkin-Elmer argues that the jury's verdicts can be reconciled and that, therefore, the grant of TA's JMOL was improper.

TA contends, however, that the district court did not base its grant of JMOL on a determination that the, jury's verdicts were inconsistent, but, rather, on its conclusion that the verdict of noninfringement was not supported by substantial evidence. TA I urges that the only difference between claim 73 and the other claims is deconvolution. TA argues that the evidence of record demonstrates that the accused device performs deconvolution; accordingly, TA asserts, there is a lack of substantial evidence to support a finding that the accused device does not perform this function. TA responds to Perkin-Elmer's argument that the district court's instruction defining deconvolution imposed an additional requirement on the claims that the jury found not to be infringed. TA asserts that the instruction at

issue related to element (c) of the claims, "varying the temperature of the sample in the differential scanning calorimeter according to the selected underlying heating rate, the selected modulation frequency and the selected modulation amplitude," rather than to element (i).

An infringement analysis entails two steps: (1) determining the meaning and scope of the claims and (2) comparing the properly construed claims to the accused device. See Markman, 52 F.3d at 975, 34 USPQ2d at 1326. The parties do not appeal the district court's claim construction; accordingly, the only issue before us is whether the accused device falls within the scope of the asserted claims. Because we accept the jury's verdict that claim 73 of the '291 patent was infringed under the doctrine of equivalents, our inquiry boils down to whether, given that the accused device falls within the scope of claim 73, there is substantial evidence that the accused device does not fall within the scope of claim 17 of the '755 patent or claims 1, 11, 21, 37 and 41 of the '306 patent.

Both parties appear to agree that the primary difference between claim 73 and the other claims is that claim 73 recites "separating" the data whereas the other claims recite "deconvoluting" the data. The Reading patents, however, define "deconvolution" as "the process of separating the dependence of a characterizing physical parameter on a driving variable into two or more component parts." '775 pat., col. 3., ll. 37-40

(emphasis added). We are not persuaded by Perkin-Elmer's argument that the district court's claim construction imposed a requirement on the claims that recite deconvolution that it did not impose on claim 73. Perkin-Elmer points to no evidence of record that would support a finding that there is a difference between applying a temperature program to a sample, as set forth in the district court's claim construction, and varying the temperature of the sample according to a temperature program, as recited in claim 73.[5] Accordingly, we agree with the district court that, given the jury's verdict that claim 73 is infringed, substantial evidence does not support the jury verdict that the other claims are not infringed.[6]

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[5] The lack of evidence on this issue is not surprising because the issue arose from the district court's jury instructions, which came after the close of the evidence.

[6] We note that the district court appears to have granted JMOL of infringement "either by the doctrine of equivalents or literally." TA Instrs., Inc. v. Perkin-Elmer Corp., No. C.A. 95-545 (Dec. 7, 1998) (Order). In granting JMOL as to literal infringement, the court may have overlooked the fact that the jury found that claim 73 was not literally infringed. No portion of the district court's JMOL opinion addresses literal infringement separately from infringement under the doctrine of equivalents or determines that substantial

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Thus, we affirm the JMOL to the extent it held claim 17 of the '755 patent and claims 1, 11, 21, 37 and 41 of the '306 patent infringed under the doctrine of Equivalents.

B. Validity

The jury found that claim 73 of the '291 patent was invalid as obvious. The only prior art reference before the jury was Mraw. Mraw was alleged to anticipate steps (a) - (i) of claim 73 and to render obvious step (j). At issue on appeal is whether Mraw teaches step (i), "separating the dependence of the heat flow data set on temperature into at least one component data set."

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evidence does not support the jury verdict that claim 73 was not literally infringed. Perkin-Elmer argues that the verdict of no literal infringement is supported by substantial evidence, and TA does not present any arguments to the contrary. Moreover, at oral argument TA agreed that we could uphold the JMOL with respect to infringement under the doctrine of equivalents without finding that the claims were literally infringed Because Perkin-Elmer's liability is the same whether it infringes the claims literally or under the doctrine of equivalents, any error the district court made in granting JMOL of literal infringement is harmless. Nevertheless, we affirm the grant of JMOL only with respect to infringement under the doctrine of equivalents.

Mraw discusses the accuracy of DSC in measuring heat capacity. Mraw used a temperature program that consisted of repeating, alternating units of a linear temperature ramp and an isotherm. In such a program, when temperature is plotted against time, an upwardly sloping zigzag line results. Mraw ran the temperature program on two samples-sapphire and pyrite- and obtained heat flow and heat capacity data for the samples. Mraw obtained this data by two different methods, the scanning method and the enthalpy method. The samples were subjected to the same temperature program under each method; only the collection and treatment of data was different. In the scanning method, the amplitude of the signal produced by the DSC was measured, while in the enthalpy method, the area under the curve defined by the signal and the baseline was measured. Both methods yielded heat capacity data for the samples at the selected temperatures. Mraw concluded that both the scanning method and the enthalpy method resulted in accurate heat capacity data.

Perkin-Elmer argues that Mraw teaches step (i) of claim 73 because it separates the differential heat flow signal in two different ways, the enthalpy method and the scanning method, to produce two component signals, one from the scanning method and one from the enthalpy method. Perkin-Elmer argues that substantial evidence supports the jury verdict of obviousness because Dr. Marguiles, Perkin-Elmer's technical expert, testified at trial that Mraw separated the

heat flow signal into components and also testified that any claim broad enough to cover the accused device would be invalid in view of Mraw.

TA asserts that: the district court correctly granted JMOL that claim 73 is not obvious in view of Mraw because Mraw does not teach step (i) of claim 73. TA contends that Mraw did not separate its heat flow data into components, but merely used two different methods to measure heat capacity. TA argues that two calculations of heat capacity from measured heat flow signals obtained by two different methods does not constitute the separation of a measured signal into one or more of its components, as recited in claim 73.

Obviousness is a question of law based on underlying factual inquiries, including the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the art at issue. See Graham v. John Deere Co., 383 U.S. 1, 16 (1966). We agree with the district court that substantial evidence does not support the finding implicit in the jury verdict that Mraw teaches step a of claim 73.

Mraw did not state that it separated data into components. Instead, Mraw merely calculated the heat capacity of sapphire and pyrite by two different methods, the scanning method and the enthalpy method. In both methods, the sample was subjected to the same temperature program and differential heat flow was measured. Thus,

the output signal of both methods was differential heat flow. The two methods differed only in how the signal was used to calculate heat capacity. In the scanning method, the amplitude of the signal, relative to the baseline, was used to calculate heat capacity. In the enthalpy method, the area under the curve defined by the signal and the baseline was integrated to calculate heat capacity. The heat flow signal was never separated into components, as recited in step (i) of claim 73 of the '291 patent.

The testimony of Dr. Marguiles cited by Perkin-Elmer does not provide substantial evidence that Mraw teaches step (i) of claim 73. Most of the Marguiles testimony related to a reverse doctrine of equivalents analysis, see Wilson Sporting Goods Co. v. David Geoffrey & Assoc., 904 F.2d 677, 14 USPQ2d 1942 (Fed. Cir. 1990), not an obviousness analysis. See Trial Tr. 1591. Specifically, Dr. Marguiles testified that if he were to assume that the Reading patents encompassed the accused device, he would conclude that the Reading patents were obvious. See Trial Tr. at 1548, 1591-92. This testimony is not substantial evidence that Mraw renders the claims obvious, although it may explain the jury verdict.

Dr. Marguiles' testimony that Mraw's measurement of heat capacity on two different days might be a "deconvolution," Trial Tr. at 1751-52, does not demonstrate that Mraw teaches "deconvolution" as that term is used in the claims. The district court's claim construction did not define

the term as broadly as Dr. Marguiles, who testified that "deconvolution" might include "the processing of data to extract very general signals or to extract information." Compare Trial Tr. at 2621-22 (setting forth the district court's claim construction with respect to "deconvolution") and Trial Tr. at 1752 (setting forth Dr. Marguiles' understanding of "deconvolution"). Perkin-Elmer also points to Dr. Marguiles' testimony that if the sample did not undergo a transition during the temperature range, tested, the total heat flow measured by Mraw would be the same as the rapidly reversible component calculated in the TA device. See Trial Tr. at 1597. This testimony, however, does not indicate that Mraw teaches separating data into one or more components.

Because the record lacks substantial evidence to support the jury verdict that claim 73 of the '291 patent is invalid for obviousness, we affirm the district court's grant of JMOL that this claim is valid.

IV.

Perkin-Elmer argues that the district court abused its discretion when it conditionally granted TA's motion for a new trial on the issues of infringement, obviousness, and willfulness. Because the grant of a new trial on the issues of infringement and obviousness was conditioned on a reversal of the JMOL that we affirm, we need not address that ruling. Accordingly, we consider only the district court's conditional grant of a new trial on the issue of willfulness.

The jury found that Perkin-Elmer's infringement of claim 73 of the '291 patent was not willful. The district court granted TA's motion for a new trial on this issue for two reasons. The court concluded that the jury had violated its instructions when it reached this issue without first finding that claim 73 was valid. In addition, the court reasoned that the verdict on this issue was predicated on the jury's erroneous conclusions concerning the obviousness of claim 73 and the noninfringement of the other asserted claims. See TA Instrs. Inc. v. Perkin-Elmer Corp., 95-545, slip op. at 20-21 n.10 (Dec. 7, 1998).

We review the grant of a new trial for abuse of discretion. See Georgia-Pacific Corp. v. United States Gypsum Co., 195 F.3d 1322, 1333, 52 USPQ2d 1590, 1599 (Fed. Cir. 1999). Because Fed. Rule Civ. P. 50(c) requires courts to "specify the grounds for granting . . . the motion for the new trial," we review the grant of a new trial in light of the grounds set forth by the district court. Fed. Rule Civ. P. 50(c) (1998). We find it instructive that the court did not grant a new trial based on a finding that the verdict of nonwillfulness was against the weight of the evidence, cf. id., 52 USPQ2d at 1600 ("When a verdict is against the weight of the evidence a court may grant a new trial."), or on a finding that an error had occurred that made the trial unfair, cf. Orthokinetics, Inc. v. Safes Travel Chairs, Inc., 806 F.2d 1565, 1580, 1 USPQ2d 1081, 1094 (Fed. Cir. 1986) (reversing the grant of a new trial where the moving party had failed to show prejudice from the alleged

error). Instead, the court relied only on the jury's supposed failure to follow its instructions and the inconsistency between the other jury verdicts and the court's JMOL grants.

Contrary to the district court's conclusion, the jury followed the jury instructions and the instructions on the special verdict form when it reached the issue of willfulness. Although the court did tell the jury that it would be asked to consider the issue of willfulness if it found that "at least one claim . . . has been infringed and has not been proven invalid," Trial Tr. at 2615, this instruction was given in the overview of the court's charge to the jury, and did not clearly tell the jury that it should not reach the issue of willfulness unless it first found a claim to be both infringed and valid. Moreover, the more specific jury instruction did not predicate a finding of willfulness on a finding of validity. This instruction stated:

> If you find . . . that any Perkin-Elmer product infringes at least one of the claims of the TA patents, you must further decide whether or not TA has proved by clear and convincing evidence that Perkin-Elmer's infringement was willful.

Trial Tr. at 2628. The specific jury instructions do not discuss the issue of validity until after this instruction on willfulness. See Trial Tr. at 2630-35. The special verdict form also led the jury to

address the issue of willfulness before addressing validity. Questions 1 and 2 of the special verdict form were directed to infringement. Question 3 was directed to willfulness:

> If you answered "YES" with respect to any claim in question 1 or question 2, you must answer this question. Otherwise, skip to question 4. Has TA Instruments proven by clear and convincing evidence that Perkin-Elmer's Infringement of TA's patents was willful?

Questions 4, 5 and 6 were directed to validity (best mode, anticipation, and obviousness, respectively), and no other question was directed to willfulness. Thus, the jury followed the jury instructions given by the district court and the instructions on the special verdict form when it reached the question of willfulness.

TA argues that the jury verdict of nonwillfulness is suspect because it was rendered in the context of a finding of no liability. This argument fails for several reasons. First, the order in which the jury reached the individual verdicts is not apparent from the record. If the jury followed the order of the special verdict form, it would have decided that Perkin-Elmer's infringement was not willful before it made its decision of invalidity. In that case, the finding of invalidity (and, hence, no liability) would not undermine the finding of nonwillfulness because the issue of willfulness

would have been decided first. Perhaps more importantly, if TA was concerned about the soundness of a verdict on willfulness reached in the absence of a finding of both infringement and validity, it should have asked for clearer jury instructions on the issue, and should have challenged the structure of the special verdict form. Because TA apparently did neither, it cannot now challenge the jury verdict based on the order in which the jury may have reached its decision.

The inconsistency between the district court's grant of JMOL and the jury verdict as to the obviousness of claim 73 and the noninfringement of the other claims does not warrant the grant of a new trial on the issue of willfulness. As discussed above, if the jury reached the issues in the order presented on the special verdict form, it would have decided the issue of willfulness before it decided the issue of validity. Accordingly, the verdict of nonwillfulness may not have been influenced by the verdict of invalidity.

Moreover, although the jury found only one of the asserted claims to be infringed, the evidence on the issue of willfulness was the same for all of the asserted claims. See e.g., Trial Tr. at 1391-92, 1467-1501. Because neither the district court nor TA questioned the sufficiency of the evidence supporting the verdict of nonwillfulness or asserted that the verdict was against the weight of the evidence, the district court's grant of a new trial on this issue was an abuse of discretion. We

therefore vacate the district court's conditional grant of a new trial on the issue of willfulness.

V.

Perkin-Elmer also appeals the district court's final judgment that TA does not infringe the Babil patent. After the district court construed the claims of the Babil patent, Perkin-Elmer conceded that it could not establish infringement under that claim construction. See Trial Tr. at 2349. Accordingly, the issue of TA's infringement of the Babil patent was not submitted to the jury, and the court entered final judgment of noninfringement in favor of TA. See TA Instrs., Inc. v. Perkin-Elmer Corp., 99-545 (Apr. 6, 1999). The only issue before us, therefore, is whether the district court properly construed claim 1 of the Babil patent.

A. The Babil Patent

The Babil patent is directed to a device for heating or cooling a sample to a desired temperature. The Babil device ensures that the sample experiences the precise temperature that is selected. See Babil pat., col. 1., ll. 38-43. The invention automatically calibrates temperature so that the sample temperature is the same as the selected temperature across a range of temperatures. See id.

The specification of the Babil patent describes the calibration process as follows: The device calibrates temperature at three tempera-

tures (the "calibration temperatures") within the temperature range that is going to be used. See id. at col. 1, II. 49-53. For each of the three temperatures, the device is commanded to reach the selected temperature and permitted to stabilize. Then, the device calculates the difference between the sample temperature and the selected temperature, and uses this difference to calculate an adjusted temperature. The device is then commanded to reach the adjusted temperature and is permitted to stabilize. The device calculates the difference between the sample temperature and the original selected temperature, and uses the difference to calculate a new adjusted temperature. This process is repeated until the sample temperature is the same as the selected temperature. The difference between the selected temperature and the adjusted temperature needed to obtain this result (the "correction factor") is stored in a computer memory. See id. at col. 1, I. 53 -col. 2, I. 8, col. 3, I. 24 - col. 4, I. 19. The circuitry shown in Figure 1 of the patent performs this calibration process.

According to the specification, after calibration has been completed, the correction factors are used to calculate the temperature which the device must be commanded to reach (the "corrected temperature") in order to ensure that the sample experiences the selected temperature across the range of temperatures that is going to be used. See id. at col. 5, II. 22-25. Thus, the correction factors obtained for the three calibrated temperatures are used to calculate the corrected

temperatures for all of the selected temperatures. The parties refer to the process of using the stored correction factors to calculate a corrected temperature for a selected temperature as "interpolation." The device shown in Figure 3 of the Babil patent, which includes the circuitry of Figure 1, a memory, and a processor for performing interpolation, performs this interpolation process.

Claim 1 of the Babil patent, the only claim asserted against TA, recites:

> 1. A thermal analysis system for heating or cooling a test sample to one or more temperatures within a predetermined temperature scale, comprising in combination:
>
> an oven,
>
> a sample., disposed in said oven,
>
> first means providing a signal proportional to the temperature of said sample,
>
> second means providing a signal proportional to the temperature of the oven including heater means for raising the temperature of the oven,
>
> computer means disposed between said first and second means for correcting automatically for discrepancies between oven temperatures and desired sample temperatures.

B. The Accused Device

Perkin-Elmer asserted that TA's products having an "isotrack" mode of operation infringe claim 1 of the Babil patent. The isotrack mode is alleged to perform the following steps:

> 1. The oven is commanded to reach the selected temperature.
>
> 2. The system waits until the sample temperature has stabilized, and waits for at least a predetermined time.
>
> 3. The system determines the difference between the sample temperature and the selected temperature (the "error temperature").
>
> 4. The system commands the oven to reach a temperature that is the selected temperature plus the error temperature (the "adjusted temperature").
>
> 5. Steps 2 - 4 are repeated until the sample temperature is the same as the selected temperature.

See Brief for Appellant, at 55-56.

According to Perkin-Elmer, the isotrack mode performs basically the same steps that are performed in the calibration process of the Babil patent, but incorporates the steps into the experimental runs of the accused device. The ac-

cused device does not store corrected temperatures or correction factors and does not use interpolation. Instead, the accused device is alleged to perform the above steps during experimental runs, and to repeat them every 30 seconds, to ensure that the sample temperature experiences the selected temperature.

C. The District Court's Claim Construction

The claim limitation at issue on appeal is the "computer means" limitation. The parties agreed that this limitation is a means-plus-function clause encompassed by 35 U.S.C. § 112, ~ 6. The district court noted that the function recited in this limitation is "correcting automatically for discrepancies between oven temperatures and desired sample temperatures." Trial Tr. at 2346. The court determined that the description in the Babil patent of the structure that performs this function "includes the calibration, the correction, and the memory means, all within the computer means." Trial Tr. at 2346. The court therefore construed this claim limitation as "including the function of interpolation." Trial Tr. at 2347-48.

Perkin-Elmer contends that the "computer means" limitation must be construed by determining what structure disclosed in the Babil patent performs the function of "correcting automatically for discrepancies between oven temperatures and desired sample temperatures."

Perkin-Elmer argues that this function is performed by the circuitry shown in Figure 1 of the Babil patent, or by a microprocessor implementing this circuit. It further argues that the district court improperly construed the "computer means" limitation by adding an interpolation function to the limitation. Perkin-Elmer asserts that claims 2 and 3 of the Babil patent, which recite calibration and interpolation, demonstrate through the doctrine of claim differentiation that the "computer means" of claim 1 is not required to perform these steps.

TA responds to these arguments by asserting that the Babil patent uses the phrase "correcting automatically for discrepancies between oven temperatures and desired sample temperatures" to refer to the process of determining the correction factor for a given temperature by applying the interpolation function to the correction factors of the calibrated temperatures. Thus, TA argues, the district court correctly construed the "correcting automatically" function as requiring calibration, correction and memory, and as including interpolation. TA asserts that the structure disclosed in the Babil patent that corresponds to the "computer means for correcting automatically . . ." is the device of Figure 3, which includes the circuitry of Figure 1, a memory device, and a processor that performs the interpolation routine.

Claim construction is a question of law that we review de novo. See Markman, 52 F.3d at 979,

34 USPQ2d at 1329. As a preliminary matter, we agree with the parties and the district court that the "computer means" limitation is encompassed by 35 U.S.C. § 112, 1[6. See Kemco Sales Inc. v. Control Papers Co., 208 F.3d 1352, 1360, 54 USPQ2d 1308, 1312 ("Whether the language of a claim is to be interpreted according to 35 U.S.C. § 112, 1 6, . . . is . . . a question of law, reviewed de novo."). In accordance with that statute, the limitation must be "construed to cover the corresponding structure . . . described in the specification and equivalents thereof." 35 U.S.C. § 112, T 6 ('1994). We therefore must determine what structures described in the specification of the Babil patent perform the function of "correcting automatically for discrepancies between oven temperatures and desired-sample temperatures."

The specification of the Babil patent describes two structures that perform this function. The first structure is the "automatic calibration means" shown in Figure 1. As described in the Babil patent, this structure cycles the device through the steps of commanding the oven to reach a selected temperature, permitting the sample temperature to stabilize, and comparing the sample temperature to the selected temperature, etc., until the sample temperature reaches the selected temperature. See Babil pat., col. 3, II. 40-47, col. 3, I. 56 - col. 4, I. 5. This structure "correct[s] automatically for discrepancies between oven temperatures and desired sample temperatures" by adjusting the temperature the

oven is commanded to reach until the sample experiences the selected temperature.

The second structure that performs the recited function is the structure shown in Figure 3, which automatically calculates a corrected temperature for each selected temperature. This structure includes the automatic calibration system of Figure 1, the memory 36 of Figure 1, and a processor that applies the interpolation function to determine the corrected temperature corresponding to each selected temperature. See id. at col. 5, l. 36 - col. 6, l. 13. This structure calibrates the device at the calibration temperatures, stores the correction factors for each calibrated temperature, interpolates a corrected temperature for each selected temperature, and commands the oven to reach the corrected temperature corresponding to the selected temperature. See id. at col. 6, ll. 1-13. This structure "correct[s] automatically for discrepancies between oven temperatures and desired sample temperatures" by calculating a corrected temperature corresponding to the selected temperature and commanding the oven to reach the corrected temperature so that the sample experiences the selected temperature.

Although the district court was reluctant to construe claim 1 as encompassing both the type of automatic correction performed by the automatic calibration system of Figure 1 and the type of automatic correction performed by the automatic calculation system of Figure 3, see Trial Tr.

at 2346-47, claim 1 itself supports such a broad construction. The function recited in the claim is "correcting automatically," and there is no limit on how this function is performed. The specification describes two structures that perform this function, the structure of Figure 1, which corrects automatically without interpolation, and the structure of Figure 3, which corrects automatically using interpolation. Both of these structures are corresponding structures for the recited "computer means. . ." under 35 U.S.C. § 112, ¶ 6. See Smiths Indus. Med. Sys., Inc. v. Vital Signs, Inc., 183 F.3d 1347, 1357, 51 USPQ2d 1415, 1422 (Fed. Cir. 1999) (noting that it is the recited "function alone that serves as the touchstone for identifying the disclosed, corresponding structure").

Because the district court's judgment of noninfringement of the Babil patent was based on an erroneous claim construction, we vacate that judgment and remand for further proceedings consistent with this opinion.[7]

---

[7] In so doing, we reject Perkin-Elmer's argument that we can reverse the judgment of noninfringement based on the proffer Perkin-Elmer made as to the accused device. Even if there is no dispute as to the operation of the accused device, infringement of a claim under section 112, paragraph 6, is a question of fact, see Odetics, Inc. v.

(Continued on next page)

VI.

For the foregoing reasons, we affirm the district court's grant of TA's JMOL to the extent that the court held that Perkin-Elmer infringed claim 17 of the '755 patent and claims 1, 11, 21, 37 and 41 of the '306 patent under the doctrine of equivalents. We also affirm the district: court's grant of TA's JMOL that claim 73 of the '291 is valid. However, we vacate the district court's conditional grant of a new trial on the issue of the willfulness of Perkin-Elmer's infringement of the Reading patents. Finally, we vacate the district court's judgment that TA does not infringe claim 1 of the Babil patent, and remand the case to the district court for further proceedings consistent with this opinion.

Each party shall bear its own costs.

(Continued from previous page)

Storage Tech. Corp., 185 F.3d 1259, 1268, 51 USPQ2d 1225, 1230 (Fed. Cir. 1999), that we will not decide in the first instance. Moreover, as TA emphasizes, TA has not had an opportunity to present any evidence on any defenses to Perkin-Elmer's infringement counter-claim. Accordingly, a reversal would not be appropriate on the present record.

Appendix B – Order Of The United States Court Of Appeals For The Federal Circuit Denying Petition For Rehearing, Dated And Filed July 10, 2000

O R D E R

A combined petition for panel rehearing and rehearing en banc having been filed by the APPELLANT, and the petition for rehearing having been referred to the panel that heard the appeal, and thereafter the petition for rehearing en banc having been referred to the circuit judges who are in regular active service,

UPON CONSIDERATION THEREOF, it is

ORDERED that the petition for rehearing be, and the same hereby is, DENIED and it is further

ORDERED that the petition for rehearing en banc be, and the same hereby is, DECLINED.

The mandate of the court will issue on July 17, 2000.

FOR THE COURT,
s/ Jan Horbaly
Jan Horbaly
Clerk

Dated: July 10, 2000

cc: Lawrence B. Goodwin
Richard McMillan, Jr.

TA INSTRUMENTS V PERKIN-ELMER CORP, 99-1358
(DCT - 95-CV-545)

Note: Pursuant to Fed. Cir. R. 47.6, this order is not citable as precedent. It is a public record.

Appendix C – Jury Special Verdict Form, entered February 2, 1998

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

TA INSTRUMENTS, INC., Plaintiff, v. THE PERKIN–ELMER CORPORATION, Defendant.	)	Civil Action No- 95-545-SLR

SPECIAL VERDICT FORM

TA Instruments' Patents (Liability)

1. Has TA Instruments proven by a preponderance of the evidence that Perkin-Elmer's DDSC instruments literally infringe the following asserted claims of TA's MSDC patents?

	Yes (infringed)	No (not infringed)
'775 Patent		
Claim 17	_____	_____
'306 Patent		
Claim 1	_____	_____
Claim 11	_____	_____
Claim 21	_____	_____
Claim 26	_____	_____
Claim 37	_____	_____
Claim 41	_____	_____
'291 Patent		
Claim 11	_____	_____
Claim 38	_____	_____
Claim 73	_____	_____
Claim 88	_____	_____

2. Has TA Instruments proven by a preponderance of the evidence that Perkin–Elmer's DDSC instruments infringe the following asserted claims of TA's MDSC patents under the doctrine of equivalents?

	Yes (infringed)	No (not infringed)
'775 Patent		
Claim 17	_____	_____
'306 Patent		
Claim 1	_____	_____
Claim 11	_____	_____
Claim 21	_____	_____
Claim 26	_____	_____
Claim 37	_____	_____
Claim 41	_____	_____
'291 Patent		
Claim 11	_____	_____
Claim 38	_____	_____
Claim 73	_____	_____
Claim 88	_____	_____

3. If you answered "YES" with respect to any claim in question 1 or question 2, you must answer this question. otherwise, skip to question 4.

Has TA Instruments proven by clear and convincing evidence that Perkin-Elmer's infringement of TA's patents was willful?

YES _____ NO _____

4. Has Perkin-Elmer proven by clear and convincing evidence that the following claims of TA's patents are invalid for failure. to include a description of the best mode of practicing the invention in the patent application?

	Yes (invalid)	No (not invalid)
'775 Patent		
Claim 17	_____	_____
'306 Patent		
Claim 1	_____	_____
Claim 11	_____	_____
Claim 21	_____	_____
Claim 26	_____	_____
Claim 37	_____	_____
Claim 41	_____	_____
'291 Patent		
Claim 11	_____	_____
Claim 38	_____	_____
Claim 73	_____	_____
Claim 88	_____	_____

5. Has Perkin–Elmer proven by clear and convincing evidence that the following claims of TA's patents are invalid because the invention recited in those claims was anticipated by the Mraw article?

	Yes (invalid)	No (not invalid)
'775 Patent		
Claim 17	_____	_____
'306 Patent		
Claim 1	_____	_____
Claim 11	_____	_____
Claim 21	_____	_____
Claim 37	_____	_____
Claim 41	_____	_____
'291 Patent		
Claim 11	_____	_____
Claim 38	_____	_____

6. Has Perkin-Elmer proven by clear and convincing evidence that claim 26 of TA's '306 patent and claims 73 and 88 of TA's 291 patent are invalid because the inventions recited in those claims were obvious?

	Yes (invalid)	No (not invalid)
'306 Patent		
Claim 26	_____	_____
'291 Patent		
Claim 73	_____	_____
'291 Patent		
Claim 88	_____	_____

If you have found that any of TA's asserted patent claims have been infringed and are valid, you must consider what damages should be awarded to TA.

7. (a) Has TA proven by a preponderance of the evidence that it is entitled to lost sales damages for lost profits due to sales made by Perkin-Elmer that TA would have made?

YES _____ NO _____

(b) If the: answer to question 7a is YES, what is the amount of TA's damages due to lost sales?

$_____

8. (a) Has TA proven by a preponderance of the evidence that it is entitled to price erosion damages on the sales TA made, because TA had to discount its actual sales price due to the competition from Perkin-Elmer?

YES _____ NO _____

(b) If the answer to question 8a is YES, what is the amount of TA's damages due to price erosion?

$_____

9- If you have found that Perkin-Elmer infringed valid claims of TA's patents, please indicate the amount of the reasonable royalty damages that you award to TA:

$_____

THE FOREGOING IS THE VERDICT OF THE JURY

EACH FOR MUST SIGN BELOW

s/ Barbara Marin	s/ Erlean Maruel
Foreperson	Juror
s/ David B. Coffin	s/ Fraslik T. Walton
Juror	Juror
s/ Deborah A. Wright	s/ Linda S. Finley
Juror	Juror
_____	s/ Donna R. Mies
Juror	Juror

Dated: 2-2-98

Appendix D – Judgment in favor of defendant consistent with the jury's verdict, dated February 19, 1998

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

TA INSTRUMENTS, INC., Plaintiff, v. THE PERKIN-ELMER CORPORATION, Defendant.	Civil Action No. 95-545 SLR

JUDGMENT IN A CIVIL CASE

WHEREAS, this action came before the court for a trial by jury.

WHEREAS, the court entered final judgment of noninfringement of the '641 patent by TA Instruments, Inc. on January 28, 1998.

WHEREAS, the jury rendered its verdict on the '775, '306, and '291 patents on February 2,

1998 and answered a verdict form, a copy attached hereto.

IT IS ORDERED AND ADJUDGED that judgment be and is hereby entered in favor of plaintiff, TA Instruments, Inc., consistent with the court's ruling.

IT IS FURTHER ORDERED AND ADJUDGED that judgment be and is hereby entered in favor of defendant, The Perkin-Elmer Corporation, consistent with the jury's verdict.

s/ Sue L. Robinson
District Judge

Date: February 19, 1998

s/ Lisa C. Friedkin
(By) Deputy Clerk

Appendix E – Corrected Judgment, entered on March 10, 1998

UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

TA INSTRUMENTS, INC.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civil Action No. 95-545-SLR
	)	
	)	
THE PERKIN-ELMER CORPORATION,	)	
	)	
	)	
Defendant.	)	

CORRECTED JUDGMENT

At Wilmington this 6th day of March, 1998,

IT IS HEREBY ORDERED that the second WHEREAS paragraph ("WHEREAS, the court entered final judgment of non-infringement of the '641 patent by TA Instruments, Inc. on January 28, 1998.") of the Judgment entered on

February 19, 1998 (D.I. 322) be corrected to read as follows:

> WHEREAS, the court made a ruling of noninfringement of U.S. Patent No. 4,246,641 by TA Instruments, Inc. on January 28, 1998,

In all other respects, the Judgment as entered shall remain the same.

s/ Sue L. Robinson
United States District Judge

Appendix F – Opinion Of The United States District Court For The District Of Delaware, Entered December 9, 1998

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

TA INSTRUMENTS, INC.	)	
	)	
Plaintiff,	)	
	)	
v.	)	C.A. No. 95-545 -SLR
	)	
	)	
THE PERKIN-ELMER CORPORATION,	)	
	)	
	)	
Defendant.	)	

Richard K. Herrmann, Esquire, and Mary B. Matterer, Esquire, of Blank, Rome, Comisky & McCauley LLP, Wilmington, Delaware. Attorneys for plaintiff. Of counsel: Richard McMillan, Jr., Esquire, Lawrence J. Gotts, Esquire, Aslan Baghdadi, Esquire, and David C. Isaacson, Esquire, of Crowell & Moring LLP, Washington, D.C.

Robert K. Payson, Esquire, and Joanne Ceballos, Esquire, of Potter, Anderson & Corroon LLP, Wilmington, Delaware. Attorneys for defendant. Of

counsel: Lawrence B. Goodwin, Esquire, Marc J. Pensabene, Esquire, and Philip E. Levy, Esquire, of Orrick, Herrington & Sutcliffe LLP, New York, New York. David Aker, Esquire, of The Perkin-Elmer Corporation, Norwalk, Connecticut.

OPINION

Date: December 7 , 1998
Wilmington, Delaware

ROBINSON, District Judge

I. INTRODUCTION

Plaintiff TA Instruments, Inc. is the assignee of all rights, title, and interest in and to U.S. Patent Nos. 5,224,775 ("the '775 patent"), 5,346,306 ("the '306 patent"), and 5,439,291 ("the '291 patent"). (D.I. 1, ¶¶ 9-12) Generally speaking, these patents disclose an analytical technique using a differential scanning calorimeter whereby a material is "driven . . . through a transition" by an independent physical parameter, such as temperature, in order to study the material's properties. (D. I. 1, Exs. A-D) Beginning in March 1995, defendant The Perkin-Elmer Corporation introduced and began sale of its Dynamic Differential Scanning Calorimeter ("DDSC"). (D.I. 1, ¶ 15)

On September 7, 1995, plaintiff filed a complaint alleging, 'n r alia, that defendant has infringed and/or is continuing to infringe, either :Literally or by the doctrine of equivalents, one or more claims of the '775, '306, and '291 patents by making, using, offering to sell, and selling DDSC instruments. (D.I. 1, ¶ 17) Plaintiff characterizes said infringement as being "deliberate, willful, wanton, intentional and with full knowledge of the existence and validity" of its patents. (D.I. 1, ¶ 18) On March 15, 1996, defendant filed an answer denying infringement and asserting several counterclaims and affirmative defenses. (D.I. 8)

The defenses included, inter, that the patents are invalid for obviousness.(D.I. 8, ¶ 28)

On January 13 through January 30, 1998, the court held a jury trial on the issues of infringement and validity. By verdict rendered on February 2, 1998, a jury found that plaintiff had failed to prove by clear and convincing evidence that claim 17 of the '775 patent; claims 1, 11, 21, 26, 37, and 41 of the '306 patent; and claims 11, 38, and 88 of the '291 patent are infringed by defendant's DDSC, either literally or by the doctrine of equivalents. (D.I. 301) The jury also found that defendant had failed to establish that these claims are invalid. (D.I. 301) Finally, the jury found that defendant's DDSC infringes, either literally or by the doctrine of equivalents, claim 73 of the '291 patent, but that this claim is invalid for obviousness in light of the prior art. (D.I. 301)

At the close of evidence, plaintiff moved for judgment as a matter of law ("JMOL") under Fed. R. Civ. P. 50(b) on the issues of infringement and validity. (D.I. 313 at 2125-32) At that time, the court reserved judgement on all JMOL motions. (D.I. 313 at 2126, 2132) Currently before the court is plaintiff's renewed motion for JMOL or, alternatively, for a **new trial under** Fed. R. Civ. P. 59 on the issues of infringement, validity, willful-

ness, and damages.[1]' (D.I. 326) Specifically, plaintiff requests entry of JMOL that (1) defendant's DDSCs infringe, both literally and under the doctrine of equivalents, claim 17 of the '775 patent and claims 1, 11, 21, 37, and 41 of the '306 patent; (2) defendant's DDSCs literally infringe claim' 73 of the '291 patent; and (3) claim 73 of the '291 is not invalid as obvious in light of the prior art. (D.I. 326)

---

1 In its motion, plaintiff waives the right to further jury trial pursuant to Fed. R. Civ. P. 39 with respect to the issues of willfulness and damages, agreeing to submit these issues to the court for determination, as long as defendant similarly agrees to waive its right. (D.I. 326) Should defendant not waive its right to further jury trial, plaintiff requests entry of judgment with respect to Liability for infringement as well as immediate entry of an injunction. (D.I. 326) The court notes that defendant has opted to exercise its right to, have all fact issues determined by a jury. (D.I. 333 at 31)

In addition, plaintiff requests that this court (1) conditionally grant it a new trial pursuant to Fed. R. Civ. P. 50(c)(1) in the event of reversal of the court's JMOL and (2) grant a new trial with respect to the issues of willfulness and damages following appellate review, to the extent such issues have not been previously resolved by the parties. (D.I. 326)

II. STANDARD OF REVIEW

By its motion for entry of JMOL or, alternatively, for a new trial, plaintiff seeks relief from an adverse jury verdict. To prevail on a renewed motion for JMOL following a jury trial, a party "'must show that the jury's findings, presumed or express, are not supported by substantial evidence or, if they were, that the legal conclusion(s) implied [by] the jury's verdict cannot in law be supported by those findings.'" Pannu v Iolab Corp., 155 F.3d 1344, 1348 (Fed. Cir. 1998) (quoting Perkin-Elmer Corp, v. Computervision Corp., 732 F.2d 888, 893 (Fed. Cir. 1984)). "'Substantial" evidence is such relevant evidence from the record taken as a whole as might be acceptable by a reasonable mind as adequate to support the finding under review." Perkin-Elmer Cord., 732 F.2d at 893. In assessing the sufficiency of the evidence, the court must draw all reasonable inferences from the evidence in the light most favorable to the nonmovant. See id.; Richardson-Vicks Inc. v UpJohn Co., 122 F.3d 1476, 1479 (Fed. Cir. 1997). The appropriate inquiry is whether a reasonable jury, given the facts before it, could have arrived at the conclusion it did. See Dawn Equip Co. v. Kentucky Farms, Inc., 140 F.3d 1009, 1014 (Fed. Cir. 1998) (citing Markman v. Westview Instruments, Inc., 52 F.3d 967, 975-76 (Fed. Cir. 1995) (en banc)). The court may not determine the credibility of the witnesses nor "substitute its choice for that of the jury between conflicting elements of the evidence." Perkin-Elmer Corp., 732 F.2d at 893.

Likewise, in order to promote finality after trial, as well as to preserve the historical function of the jury as the trier of facts, the court "ought to grant a new trial on the basis that the verdict was against the weight of the evidence only where a miscarriage of justice would result if the verdict were to stand." Williamson v. Consolidated Rail Corp., 926 F.2d 1344, 1352 (3d Cir. 1991).

III. DISCUSSION

A. Infringement

Under § 271(a) of the Patent Act,

> [e]xcept as otherwise provided in this title, whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States . . . during the term of the patent therefor, infringes the patent.

35 U.S.C. § 271(a). Determining infringement is a two-step process. First, the court must construe the asserted claims so as to ascertain their meaning and scope. See Kahn v. General Motors Corp., 135 F.3d 1472, 1476 (Fed. Cir. 1998) . Here, the parties do not dispute the court's construction of the claims. Second, the claims as construed are compared to the accused device. See id. In order to be found infringing, each and every claim element must be present, either literally or by an equivalent, in the accused de-

vice. See Dolly, Inc. v. Spalding & Evenflo Cos., 16 F.3d 394, 398 (Fed. Cir. 1994). In the case at bar, plaintiff had the burden of proving at trial, by a preponderance of the evidence, that every claim limitation was met by the accused device. See Kahn, 135 F.3d at 1476.

1. Claims 1 and 37 of the '306 patent

Initially, plaintiff argues that, based upon the jury's verdict and the undisputed evidence of record, it is entitled to JMOL with respect to infringement of claims 1 and 37 of the '306 patent. The jury found that defendant's DDSC infringes, either literally or by equivalence, claim 73 of the '291 patent. This claim reads as follows:

> 73. A method for analyzing a material using a differential scanning calorimeter comprising the steps of:
>
> (a) selecting an underlying heating rate, modulation frequency and modulation amplitude;
>
> (b) placing a sample of the material in the differential scanning calorimeter;
>
> (c) varying the temperature of the sample in the differential scanning calorimeter according to the selected underlying heating rate, the selected modulation

frequency and the selected modulation amplitude;

(d) recording a signal representative of differential changes in the heat flow to and from the sample;

(e) storing the differential signal representative of the heat flow as heat flow data, said heat flow data forming a heat flow data set;

(i) separating the dependence of the heat flow data set on temperature into at least one component data set; and

(j) plotting said at least one component data set on an output device.

(D.I. 1, Ex. D at col. 22, lns. 32-52) The jury's finding of infringement is a determination that each and every element of claim 73 is. found in defendant's DDSC, either literally or under the doctrine of equivalents. Elements (a) - (d) of claim 73 are identical to elements (a) - (d) of claims 1 and 37 of the '306 patent. (D.I. 1, Exs. C, D) Since the jury found these elements to be satisfied by defendant's DDSC when it found infringement of

the corresponding elements of claim 73 of the '291 patent, a consistent interpretation of the jury's verdict[2] requires finding that these element', are satisfied with respect to claims 1 and 37 of the '306 patent.

Claim 73 differs from claims 1 and 37 of the '306 patent only in that claim 73 does not speak of deconvolution. Both claim 1 and 37 of the '306 conclude with an element (e) that refers to "deconvoluting." Specifically, claim 1 reads:

> (e) deconvoluting the signal representative of differential changes in the heat flow to and from the sample to compute at least one deconvoluted signal.

(D.I. 1, Ex. C at col. 16, Ins. 9-12) Similarly, claim 37 concludes:

---

2. The court is required to adopt a view of the case that is consistent with the jury's verdict. See, e.g., Anastasia v. Schering Corp., 838 F.2d 701, 710 (3d Cir: 1988) (holding that the district court was correct in adopting a view of the case "under which the jury's answers to the interrogatories are consistent"); Barnhart v. Dollar Rent a Car Sys., Inc., 595 F.2d 914, 919 (3d Cir. 1979) (stating that 'a court must interpret a jury's findings of fact as consistent whenever possible").

> (e) deconvoluting the signal representative of differential changes in the heat flow to and from the sample to compute two deconvoluted signals.

(D.I. 1, Ex. C at col. 20, Ins. 51-53) By contrast, elements (e), (i), and (j) of claim 73 of the '291 patent refer to storing the heat flow data, 'separating . . . the heat flow data . . . into at least one component data set," and plotting the component data set "on an output device." (D.I. 1, Ex. D at col.. 22, Ins. 45-52) Thus, the difference in the jury's infringement findings with respect to claims 1 and 37 of the '306 patent and claim 73 of the '291 patent must be attributable to the issue of deconvolution, i.e., it is reasonable to infer that the jury determined that the DDSC did not "deconvolute" as recited in claims 1 and 37 but did "separat[e] . . . into at least one component data set:" within the meaning of claim 73 of the '291 patent.[3]

---

[3] Defendant argues that claim 73 is broader than claims 1 and 37 because it does not require deconvolution into "two or more component parts" but only separation into "at least one component data set." (D.I.. 333 at 7-9) Defendant maintains it is because of this difference in scope that the jury found only claim 73 to be infringed and invalid. Such an analysis, however, begs the question as to whether there exists substantial evidence

(Continued on next page)

The issue before the court, therefore, is whether the jury's finding with respect to whether defendant's DDSC deconvolutes, as that term was defined by the court, is supported by substantial evidence. The court construed the term "deconvolution" to be a

> process of separating the dependence of a characterizing physical parameter on a driving variable into two or more component parts so that the component parts can be utilized or analyzed separately, or compared with each other. For example, the dependence of a characterizing physical parameter can be deconvoluted into rapidly reversible and nonrapidly reversible components . . . . In sum, the claims require that a signal representative of differential changes in the heat flow to and from the sample be separated into two or more component parts, and that the component parts can be identifiable for separate analysis.

(Continued from previous page)

supporting the jury's finding regarding deconvolution. A finding that there exists substantial evidence that defendant's DDSC deconvolutes is not inconsistent with a determination that claim 73 is broader in scope than claims 1 and 37.

(D.I. 328, Ex. 1)

Plaintiff contends that defendant's DDSC deconvolutes as defined by the court. In support of its contention, plaintiff points to the testimony of Dr. Marcel Margulies, defendant's expert witness and a co-inventor of the DDSC, who testified that the DDSC takes the measured heat flow signal and breaks it down into a DC and an AC component; from this latter component a real and an imaginary (or storage and loss) signal are calculated. (D.I. 311 at 1756-58, 1760)

Plaintiff also looks to the language of U.S. Patent No. 5,549,387 ("the ':387 patent"), which defendant admits accurately describes the processing used in the DDSC. The abstract of the '387 patent states that

> [t]he invention is directed to a differential analysis method and apparatus wherein . . . the measured differential signal is processed into real and imaginary components relating, respectively, to the energy storage and energy loss portions of .the signal.

(D.I. 308 at 937-39) Dr. Margulies, a co-inventor of the '387 patent, qualified this language, stating that although the DDSC calculates components of the measured heat flow signal, these signals are completely and totally independent of one another, i.e., they have a. different physical significance. (D.I. 308 at 939-40, 1758-59) He explained

that these signals are components "in the mathematical sense of the word" but not, in his opinion, as defined by plaintiff's patents. According to Dr. Margulies, the signal described by the patents at issue is broken into two parts such that the sum of those parts is equal to the input. (D.I. 308 at 939-40, 1758-59) In contrast, "[a] patent examiner with a degree in mathematics, physics, electrical engineering, reading [the '387 patent] would understand perfectly well that these are components" in the mathematical sense, i.e., the sum of the parts is not equal to the input. (D.I. 308 at 940)

Plaintiff directs the court to the testimony of other Perkin-Elmer employees as well as another co-inventor of the '387 patent, all of whom testified that the DDSC does deconvolute the heat flow signal into an AC and a DC component, consistent with the court's definition of the term, i.e., "separation of the signal into any two components." (D.I. 307 at 647-49; D.I. 309 at 1035-36; D.I. 310 at 1440-41) Finally, plaintiff looks to the testimony of its own experts, Dr. Richard Lee and Professor Bernhard Wunderlich. According to these witnesses, the DDSC separates the heat flow signal into a DC component and an AC component and then further analyzes the AC component by separating .it into two further components, in-phase and out-of-phase with the temperature, the amplitudes of which are called the. real and imaginary (storage and loss) signals. (D.I. 308 at 833; D.I. 313 at 2092-93)

Rather than counter plaintiff's assertion that the component separation aspect of deconvolution is met by the DDSC, [4] defendant argues that deconvolution requires "the application of the temperature program defined by the selected underlying heating rate, modulation frequency and modulation amplitude to the sample in order to produce deconvoluted data." (D.I. 333 at 14) Defendant's argument derives from the court's instructions to the jury regarding selection of the parameters defining the temperature program involved in the asserted patents. Specifically, the court stated that

> the temperature program defined by the selected underlying heating rate, modulation frequency, and modula-

---

[4] Defendant concedes that

> [a]ll of the asserted claims, including claim 73, include the term "components." Thus, evidence relating to the nature of the "components" that are processed by the DDSC accessory could not have been the distinguishing factor resulting in the jury's finding of infringement of claim 73 and no infringement of all other asserted claims.

D.I. 333 at 19-20) (emphasis in original).

> tion amplitude must be applied to the sample material in order to produce deconvoluted data.

(D. I. 316 at 2621;, (emphasis added).[5] The court's instructions indicated that this "applied to the sample" requirement was applicable to all of the asserted claims. (D.I. 316 at 2620) According to defendant, a logical explanation of the jury's verdict is that, based upon substantial evidence presented at trial, the jury found the DDSC does not apply a temperature program defined by an underlying heating rate, modulation frequency, and modulation amplitude to the sample in order to produce deconvoluted data.

Assuming for purposes of the following analysis that applying a temperature program to heat a sample is part of "deconvolution" and not, as

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[5] Prior to trial, the court had denied the parties' cross motions for summary judgment on the basis of this very issue, finding that there existed a question of fact as to "whether defendant's product, which apparently at some point translates a user-inputted step-wise temperature program into a temperature program having 'an underlying heating rate, modulation frequency and modulation amplitude,' applies the latter modulated temperature program to the subject material in order to produce deconvoluted data." (D.I. 265 at 4)

plaintiff argues, a separate element applicable to the "selection" or "input" facet of the invention,[6] there remains the question of whether defendant's argument is consistent with the jury's verdict. Elements (a) through (c) of claim 73 of the '291 patent speak to the selection of the temperature program parameters and the application of the temperature program to the sample. In finding claim 73 infringed, the jury necessarily found these elements present, either literally or by the doctrine of equivalents, in defendant's DDSC. Thus, the jury found the "applied to the sample" limitation met by the DDSC in connection with claim 73. Since this limitation is recited verbatim in elements (a) through (c) of claims 1 and 37 of the '306 patent, a consistent interpretation of 'she jury's verdict requires a determination that the absence of this limitation was not the factor upon which the jury relied to support its finding of noninfringement.

Having so found, the court must determine whether the record, without regard to evidence concerning the "applied to the sample" limitation, is sufficient to support the jury's verdict of noninfringement. In order for the accused device to infringe any of the asserted claims, it must decon-

---

6 Alternatively, plaintiff argues that the evidence presented at trial substantially supports a finding that defendant's DDSC does satisfy the "applied to the sample" requirement.

volute as that term was construed by the court. As noted above, the record indicates

> that the DDSC does separate the measured heat flow signal into two components -- a DC signal and an AC signal. This latter signal is then further divided into real and imaginary signals. Thus, the DDSC does deconvolute as required by the asserted patents. It is irrelevant to the analysis that these deconvoluted signals cannot be summed to equal the input, as such is not required by the court's construction of the term deconvolution. What is important is that these components are "identifiable for separate analysis." Defendant has not presented, nor has the court's review of the record revealed, any evidence that would support a conclusion that the DDSC does not deconvolute as that term was construed by the court. Although the court is most reluctant to enter judgment contrary to a jury's verdict, it concludes that no reasonable jury could have found noninfringement with respect to claims 1 and 37 of the '306 patent on the record created by the parties. Therefore, a verdict contrary to that rendered by the jury is compelled.

2. Claim 17 of the '775 patent; claims 1, 11, 21 37, and 41 of the '306 patent; and claim 73 of the '291 patent

Plaintiff argues that regardless of the jury's verdict the court should enter JMOL on the issue of infringement, both literal and by the doctrine of equivalence, with respect to claim 17 of the '775

patent; claims 1, 11, 21, 37, and 41 of the '306 patent; and claim 73 of the '291 patent because the uncontroverted evidence indicates that defendant's DDSC satisfies the "parameter selection" and "applied to the sample" limitations set forth in the claims at issue. Since the court previously has determined that the jury's verdict is consistent with a finding that these limitations were met by the DDSC, the court need not further address the sufficiency of the evidence in this regard in order to conclude that JMOL should be entered in favor of plaintiff.

B. Obviousness

Under 35 U.S.C. § 103,

> [a] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

In the case at bar, defendant had the burden of proving at trial, by clear and convincing evidence, that (1) all of the elements of claim 73, with the exception of claim (j), were anticipated by an article entitled "The Measurement of Accurate Heat Capacities by Differential Scanning Calorimetry Comparison of D.S.C. Results on Pyrite

(100 to 800 K) with Literature Values from Precision Adiabatic Calorimetry" and authored by S.C. Mraw and D.F. Naas ("the Mraw article") (D.I. 334); and (2) one skilled in the art at the time of the invention would have been motivated to modify the Mraw article to add a "plotter" element.[7] Thus, with respect to elements (a) - (e) and (i), defendant was required to establish at trial that all aspects of these elements are described in the 19raw article. See Glaverbel Societe Anonyme v. Northlake Marketing & Supply, Inc., 45 F.3d 1550, 1554 (Fed. Cir. 1995); see also PPG Indus., Inc. v Guardian Indus Corp., 75 F.3d 1558, 1566 (Fed. Cir. 1996); Scripps Clinic & Research Found. v. Genentech, Inc., 927 F.2d 1565, 1576 (Fed. Cir. 1991).

Although the: ultimate determination of obviousness is a question of law, the decision rests upon factual determinations. See Richardson-Vicks Inc., 122 F.3d at 1479. In determining the facts as they may have been found by the jury,

---

[7] As a result of pretrial maneuvering, defendant maintained its obviousness defense only as an adjunct to its anticipation defense. At trial,- defendant was allowed to add claims 78 and 88 to its obviousness defense only insofar as it was permitted to present evident indicating that the inclusion of a "plotter" element was a "trivial addition." (D.I. 307 at 452-462; D.I. 311 at 1612-20)

the court is required to assess the evidence in the light most favorable to the verdict winner, in this case defendant. See id. However, the court "must not lose sight of the presumption of validity." Perkin-Elmer Corp., 732 F.2d at 893. Thus, where there is a verdict of invalidity, the question is whether defendant's evidence "so met the burden imposed by 35 U.S.C. § 282 ('[t]he burden of establishing invalidity of a patent or any claim shall rest on the party asserting such invalidity') that reasonable jurors could not have concluded" that defendant did not meet the burden. Id.

Plaintiff argues that the Mraw article neither discloses nor teaches element (i) of claim 73, i.e., "separating the dependence of the heat flow data set on temperature into at least one component data set." However, the proper question on a motion for JMOL is whether there exists substantial evidence in the record to support the jury's finding that element (i) is taught by the Mraw article. The record at bar demonstrates that Dr. Mraw's intent was "to determine how accurately (not just precisely) .heat capacities could be measured by [DSC]." (D. I. 334 at B80; D.I. 308 at 795) In order to achieve this result, he measured "[t]he heat capacity of a sample of FeS_2, pyrite . . . from 100 to 300 :K by [DSC]." (D.I. 334 at B80; D.I. 308 at 795 96; D.I. 311 at 1749) Dr. Mraw performed two separate runs, each run consisting of 10 to 15 repeats, and for each run he measured the heat capacity of the pyrite sample. (D.I. 308 at 795-97; D.I. 311 at 1592, 1750-51; D.I. 334 at B81) The heat capacity of the first run was

measured using the scanning method[8] and the second using the Enthalpy method.[9] (D.I. 308 at 798; D.I. 311 at 1594-96; D.I. 334 at B84-87) Because pyrite does not go through any transitions in the temperature range studied by the Mraw article, the two methods of calculating heat capacity yielded equivalent results. (D.I. 311 at 1597)

In evaluating the Mraw article, Dr. Margulies testified that "[i]f, by deconvolution, you mean the calculation, the processing of the data to extract very general signals or to extract information, then, yes, it's a deconvolution." (D.I. 311 at 1751-52) In addition, he testified that:

> Q: Well, let me ask you this: Is it true that nowhere in the Mraw article is it disclosed that a run is made which generates a heat flow signal,

---

[8] The scanning method of calculating heat capacity involved measuring the amplitude of the DSC output signal (i.e., the differential heat: flow). In order to calculate heat capacity using the scanning method, Dr. Mraw merely subtracted the baseline value from the DSC output signal. (D.I. 311 at 1595)

[9] The enthalpy method of measuring heat capacity involved integrating the area between the DSC output signal curve and the baseline curve. (D.I. 311 at 1595-96)

and that heat flow signal, from that single run, is broken down into components. Is that true?

A. No. He subtracts a baseline.

Q. Other than subtracting a baseline, is that true?

A. Other than subtracting a baseline, I think that he uses a single run over 10, 15 steps, how ever many, and uses that information to do the calculation, yes.

Q. So the answer is he doesn't break that signal down into components; correct? Can we just agree on that?

A. He does a calculation.

Q. He does not break the signal down into components; is that correct?

A. I don't know what you call components.

(D.I. 311 at 1753-54) Dr. Lee testified that the Mraw article does not teach deconvolution as that term is "defined in [plaintiff's] patents." (D.I. 308 at 797-98) According to Dr. Lee, Dr. Mraw merely calculated heat capacity using two different methods of calculation:

> Q. So is it fair to say he does one run or experiment and then he goes through and comes up with one heat capacity measurement and then he goes back and runs another experiment using a different formulation, comes up with another heat capacity; is that correct?
>
> A. That's correct.
>
> Q. But does he ever take one set of data and unravel it into separate components . . .?
>
> A. He never satisfied the definition of [de]convolution in terms of separating into two components as defined in the patent.

(D.I. 308 at 798)

Claim 73 requires "separating the dependence of the heat flow data set on temperature into at least one component data set." Despite defendant's argument that the Mraw article teaches two ways to deconvolute -- the scanning method and the enthalpy method -- and sets forth two component data sets -- one for the scanning method and one for the enthalpy method -- such is not supported by the record. The evidence indicates that the Mraw article describes two methods of calculating heat capacity performed on two separate data sets. There is nothing in the record to support a conclusion that the calculation of heat

capacity from the measured differential heat flow signal constitutes the separation of a single measured heat flow data signal into "at least one component data set" as required by claim 73. Dr. Margulies' testimony does not indicate otherwise. At no point in the record does Dr. Margulies either expressly or implicitly indicate that the Mraw article teaches the separation of the heat flow data signal into at least one component data set. Moreover, since pyrite does not go through any transitions in the temperature range studied, the data measured by Dr. Mraw cannot possibly demonstrate the separation of component data in the presence of transitions as required by the asserted patents.

The court concludes that the evidence presented at trial does not constitute clear and convincing proof that claim 73 of the '291 patent is invalid as obvious. The Mraw article does not disclose element (i) of claim 73, i.e., it does not teach the separation of the heat flow data set "into at least one component data set." Consequently, with respect to this element it cannot be said that "[t]here [is] no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention." Scripps Clinic & Research Found., S127 F.2d at 1576. Viewing the evidence in a light most favorable to defendant, the court nevertheless concludes that the record is insufficient to support the jury's verdict on obviousness.

IV. CONCLUSION

For the reasons stated above, the court concludes that there is no legally sufficient evidentiary basis for a reasonable jury to have found for defendant on the issues of noninfringement and obviousness. Therefore, plaintiff's renewed motion for JMOL pursuant to Fed. R. Civ. P. 50(b) is granted. (D.I. 326) As a result of the finding of infringement, plaintiff is entitled to an injunction preventing defendant from infringing the asserted claims. In the event the court's grant of JMOL in favor of plaintiff is reversed, the court conditionally grants plaintiff's motion for a new trial on the issues of infringement and obviousness pursuant to Fed. R. Civ. P. 50(c)(1) and 59. Finally, with respect to the issues of willfulness and damages, the court conditionally grants plaintiff's motion for a new trial on the affirmation on appeal of this court's grant of JMOL. Such is warranted given the court's conclusions regarding the issues of infringement and validity.[10]

---

[10] As defendant correctly points out, the jury did consider the issue of willfulness, finding that defendant's infringement was not willful. Based on the court's instructions, however, the jury should not have answered the willfulness question since it did not find a Single claim of plaintiff's to be both infringed and valid. (D.I. 316 at 2615) Since the jury predicated its finding on

(Continued on next page)

An appropriate order shall issue.

(Continued from previous page)

conclusions concerning infringement and obviousness which conflict with those of the court's, the court concludes that a new trial addressing the issues of damages and willfulness is warranted.

Appendix G – Order consistent with the Opinion, entered December 9, 1998

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

TA INSTRUMENTS, INC.	)	
Plaintiff,	)	
- v. -	)	C.A. No. 95 -545-SLR
THE PERKIN-ELMER CORPORATION,	)	
Defendant.	)	

ORDER

At Wilmington this 7th day of December, 1998, consistent with the opinion issued this same day;

IT IS ORDERED that:

1. Plaintiff's renewed motion for judgment as a matter of law on the issue of infringement, either by the doctrine of equivalents or literally, with respect to claim 17 of the '775 patent; claims 1, 11, 21, 37, and 41 of the '306 patent; and claim 73 of the '291 patent (D.I. 326) is granted. Plaintiff's alternative motion for a new

trial on the issue of infringement is conditionally granted.

2. Plaintiff's renewed motion for judgment as a matter of law on the issue of obviousness with respect to claim 73 of the '291 patent (D.I. 326) is granted. Plaintiff's alternative motion for a new trial on the issue of obviousness is conditionally granted.

3. Plaintiff's request for a new trial with respect to the issues of willfulness and damages following appellate review (D.I. 326) is conditionally granted.

4. The clerk shall enter judgment as a matter of law in favor of plaintiff TA Instruments, Inc. and against defendant The Perkin-Elmer Corporation.

IT IS FURTHER ORDERED that plaintiff shall submit to the court, on or before January 15, 1999, a further order addressing the issue of injunctive relief. Defendant may respond to said proposed order on or before February 1, 1999.

s/ Sue L. Robinson

United States District Judge

Appendix H – Judgment granting Plaintiff's JMOL Motion and entering judgment in favor plaintiff, entered December 15, 1998

UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

TA INSTRUMENTS, INC.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civil Action No. 95
	)	-545-SLR
	)	
THE PERKIN-ELMER CORPORATION,	)	
	)	
	)	
Defendant.	)	

JUDGMENT IN A CIVIL CASE

For reasons stated in the opinion issued on December 7, 1998, plaintiffs renewed motion for judgment as a matter of law (D.I. 326) is granted.

IT IS ORDERED AND ADJUDGED that judgment be and is hereby entered in favor of plaintiff, TA INSTRUMENTS, INC.

s/ Sue L. Robinson
United States District Judge

Dated: December 9, 1998

s/ Lisa C. Friedkin
(By) Deputy Clerk

Appendix I – Injunction, dated March 5, 1999

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

TA INSTRUMENTS, INC.,	)	
	)	
Plaintiff and Counter-Defendant,	)	
	)	
v.	)	CA. No. 95-545 -SLR
	)	
THE PERKIN-ELMER CORPORATION,	)	
	)	
Defendant and Counter-Plaintiff.	)	

INJUNCTION

At Wilmington, Delaware, this 5th day of March, 1999, pursuant to the Court's Opinion and Order, dated December 7, 1998;

IT IS ORDERED that defendant The Perkin-Elmer Corporation ("Perkin-Elmer"), its officers, agents, servants, employees and attorneys and those persons in active concert or participation with them who receive actual notice of this Order

by personal service or otherwise, are hereby enjoined against infringing, or inducing or contributing to the infringement of, claim 17 of U.S. Patent No. 5,224,775; claims 1, 11, 21, 37, or 41 of U.S. Patent No. 5,346,306; and claim 73 of U.S. Patent No. 5,439,291 from and after the date hereof and until such time as the last of such patents expires, by making, using, offering for sale, selling, distributing or importing into the United States, without authority, Perkin-Elmer's Dynamic Differential Scanning Calorimetry Accessory (and any colorable differences thereof) ("DDSC Accessory"), and any differential scanning calorimeters, including Perkin-Elmer's DSC 7 and Pyris 1 DSC products, that incorporate a DDSC Accessory.

s/ Sue L. Robinson
United States District Judge

Appendix J – Order Directing Entry Of Final Judgment, entered March 11, 1999

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

TA FNSTRUMENTS, INC.	)	
	)	
Plaintiff and Counter Defendant,	)	
	)	
v	)	
	)	Civil Action No.
	)	95-54S-SLR
THE PERKIN-ELMER CORPORATION,	)	
	)	
Defendant and Counter Plaintiff	)	

ORDER DIRECTING ENTRY OF FINAL JUDGMENT PURSUANT TO FED. R. CIV. P. 54(b)

The Court having entered judgment of non-infringement of The Perkin-Elmer Corporation's ("Perkin-Elmer")'641 Patent by TA Instruments, Inc- ("TA") on February 19, 1998 (as corrected by Order dated March 6, 1998), and

The Court having entered judgment as a matter of law of infringement by Perkin-Elmer and

validity of TA's `775, `306 and `291 patents on December 9, 1998, and

The Court having entered an injunction against Perkin-Elmer on March 5 ,1999, and

The Court having expressly determined, pursuant to Federal Rule of Civil Procedure 54(b), that there is no just reason for delay,

IT IS HEREBY ORDERED that the Clerk of the Court is expressly directed to enter final judgment as set forth in the above-referenced judgments and injunction.

SO ORDERED this 5th day of March,1999:

s/ Sue L. Robinson

The Honorable Sue L. Robinson

Appendix K – Final Judgment, dated April 6, 1999

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

TA INSTRUMENTS, INC., Plaintiff and Counter Defendant, v. THE PERKIN-ELMER CORPORATE, Defendant and Counter-Plaintiff	C.A. No. 95-545 SLR

FINAL JUDGMENT PURSUANT TO FED.R.CIV.P. 54(b)

Pursuant to the Order Directing Entry of Final Judgment signed by the Court on March 5, 1999,

IT IS ORDERED AND ADJUDGED that final judgment pursuant to Fed.R.Civ. P. 54(b) be and is hereby entered in favor of Plaintiff, TA Instruments, Inc., and against Defendant, The Perkin-Elmer Corporation, as provided in the following judgments and injunction:

1) the judgment of non-infringement of Defendant's 4,246,641 Patent by Plaintiff, entered in this action on February 19, 1998 (D.I. 322), and corrected by the Order entered in this action on March 6, 1998 (D.I. 330);

2) the judgment, entered in this action on December 9, 1998 (D.I. 341), pursuant to the December 7, 1998 Order (D.1. 340) granting Plaintiff's motion for judgment as a matter of law (JMOL) of infringement under Fed.R.Civ.P. 50(b), and for a new trial under Fed.R.Civ.P. 59; and

3) the Order granting an injunction against The Perkin-Elmer Corporation entered in this action on March 5, 1999 (D.I. 348).

s/ Sue L. Robinson
United States District Judge

Dated: April 6, 1999

s/ Lisa C. Friedkin
(By) Deputy Clerk

Appendix L – Perkin-Elmer Motion For Judgment As A Matter Of Law, filed January 14, 1998

UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

TA INSTRUMENTS, INC., Plaintiff and Counter Defendant, vs. THE PERKIN-ELMER CORPORATION, Defendant and Counter Plaintiff.	C.A. No. 95-545 SLR

THE PERKIN-ELMER CORPORATION'S MOTION FOR JUDGMENT AS A MATTER OF LAW

Defendant, The Perkin-Elmer Corporation ("Perkin-Elmer"), pursuant to Federal Rule of Civil Procedure 50(a), moves for judgment as a matter of law against Plaintiff, TA Instruments, Inc. ("TA"), for the reasons set forth herein.

RULE 50 STANDARD

Judgment as a matter of law under Fed. R. Civ. P. 50 (a) is appropriate where, as is the case here, there is no substantial evidence to support the plaintiff's allegations. Joy Technologies Inc. v. Flakt, Inc., 820 F. Supp. 802, 805 (D. Del. 1993), Walter v. Holiday Inns, Inc., 985 F.2d 1232, 1238 (3rd Cir. 1993).

A. TA HAS NOT PROVED INFRINGEMENT

For a product to literally infringe a claim of a patent, the product must be found to include each and every limitation of the claim. Data Line Corp, v. Micro Technologies, Inc., 820 F.2d, 1196, 1202 (Fed. Cir. 1987); Amster Corp. v. Envirotech Corp., 730 F.2d 1476, 1481 (Fed. Cir.), cert. denied, 469 U.S. 924 (1984).

The Court, in its Order dated January 2, 1998, construed each of the relevant claims of U.S. Patent Nos. 5,224,775 (the "'775 patent"), 5,346,306 (the "'306 patent") and 5,439,291 (the "'291 patent") (collectively the "TA patents-in-suit") as requiring that an underlying heating rate, modulation frequency arid modulation amplitude be selected or chosen, the selection process not being limited to any particular temporal or physical format, and that the resulting modulated temperature program be applied to the sample material.

TA has offered no evidence that this claim element, as construed by the Court, is present in

the accused Perkin-Elmer DDSC accessory. In other words, TA has provided no substantial evidence to support its allegations that the Perkin-Elmer accused DDSC accessory includes or performs the required "selection." While TA's technical expert, Dr. Lee, testified that the Perkin-Elmer DDSC accessory uses a modulated temperature program that "has" a period, frequency and underlying heating rate, Trial Transcript 89:15-90:23, 95:5-95:12 (January 20, 1998), Dr. Lee did not testify that the Perkin-Elmer DDSC accessory "selects" those parameters. Moreover, TA has provided no other evidence that the Perkin-Elmer DDSC accessory "selects" those parameters.

Furthermore, infringement under the doctrine of equivalents requires that, for each claim element not literally present in the accused product, the accused product must contain an equivalent of that claim element. Warner-Jenkinson Co. v. Hilton Davis Chemical Co., 117 S. Ct. 1040, 1049 (1997). TA has provided no substantial evidence that Perkin-Elmer's DDSC accessory, to the extent it does not literally infringe the claims at issue, infringes under the doctrine of equivalents. Instead, Dr. Lee merely made conclusory statements to the effect that if any element is not literally found in the Perkin-Elmer DDSC accessory, there would be an equivalent element in the Perkin-Elmer DDSC accessory, and to the effect that if the Perkin-Elmer DDSC accessory does not literally infringe the TA patents-in-suit, it does substantially the

same thing using substantially the same process. Trial Transcript 48:11-48:17, 102:8-102:10. 102:15-102:20.

To the extent that TA has presented evidence in support of its allegations, that evidence is not competent and should not be accorded substantial weight because the source, Dr. Lee, is riot an expert in the relevant field, thermal analysis. See Wilkinson v. Rosenthal & Co., 712 F. Supp. 474, 478 (E.D. Pa. 1989) (expert with basic understanding of a subject not qualified as an expert on the precise issue for jury determination).

Accordingly, Perkin-Elmer respectfully submits that it is entitled to judgment as a matter of law that its DDSC accessory does not infringe the TA patents-in-suit.

B. PERKIN-ELMER CANNOT BE FOUND TO INFRINGE THE CLAIMS AS PROPERLY CONSTRUED

Perkin-Elmer respectfully submits that a proper construction of the claims of the TA patents-in-suit at issue in this case is set forth in its brief in support of its motion for summary judgment of noninfringement of the TA patents-in-suit (D. I. 159) and respectfully requests the Court to adopt a construction that is consistent therewith. If the claims are construed in that manner, there can be no finding of infringement and Perkin-Elmer would be entitled to judgment as a matter of law.

C. TA HAS NOT PROVED WILLFUL INFRINGEMENT

In order to prove willful infringement, a patent owner must prove by clear and convincing evidence that: (1) an accused infringer was aware of its patent; and (2) the accused infringer had no reasonable basis for concluding that it could continue manufacturing and selling its products without violating the rights of the patent owner. Ortho Pharmaceutical Corp. v. Smith, 959 F.2d 936, 944 (Fed. Cir. 1992); Kloster Speedsteel, Ab v. Crucible, Inc., 793 F.2d 1565, 1579 (Fed. Cir. 1986). TA has not provided any evidence that would satisfy its burden under the two-part test described above. Accordingly, Perkin-Elmer respectfully submits that it is entitled to judgment as a matter of law that it is not willfully infringing the TA patents-in-suit.

CONCLUSION

For the foregoing reasons, Perkin-Elmer respectfully requests that the Court enter judgment as a matter of law on the issues discussed herein.

Dated: January 14, 1998

Respectfully submitted,

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Appendix M – Testimony Of Record On The Issue Of Equivalence

Q. Okay. Dr. Lee, could you summarize for us the opinion you have reached with respect to the TA patents and the DDSC?

A. Yes. As a result of having compared the claims of the TA patent with the Perkin-Elmer DSC and specific accessory to DSC, DDSC, it's my opinion that the Perkin-Elmer DDSC is -- the elements, each and every element of the TA claims in question are found literally, exactly, in the Perkin-Elmer instrument and supporting materials as it's operated.

Further, I think to the extent there is any argument about whether it's exactly identical or functionally equivalent, the Perkin-Elmer instrument does substantially the same thing using substantially the same process in an equivalent manner as claimed in the TA patent. So I think whether you say it's exact or equivalent, either one is true.

Q. Thank you, Dr. Lee.

Now what I would like to do is *before we turn to the detailed basis of that opinion* is to talk about the invention itself briefly. A626 (Tr. 780-781).

* * * *

Q. Now, if we could just sum up with respect to Claim 17 of the '775 patent, did you reach a conclusion relative to the question of literal infringement?

A. Yes.

Q. What was your conclusion?

A. My conclusion is that the DDSC practices deconvolution literally as described in the patent; namely, the separation of the heat flow signal into two or more components. A635 (Tr. 833-834)

* * * *

Q. To the extent there are any differences, do you have an opinion as to the question of equivalence?

A. *In my opinion, if you argue that they are not identical, it's a fact that they are completely equivalent to what is specified in the patent.*

Q. Now, with respect to Claim 1 of the '306 patent, did you find that claim was literally satisfied in all respects by the DDSC?

A. Yes, I did.

Q. The same question with respect to "equivalence", to the extent there is any element which may not be found to be present at some

point, would there be an equivalent element in the DDSC?

A. *There is -- it would be equivalent if not literal.*

Q. Are your answers the same with respect to claims 11, 21, 26, 37, and 41 of the '306 patent?

A. *Yes.*

Q. And are your answers the same with respect to '291 patent claims 11, 38, 73, and 88?

A. *Yes.* A635 (Tr. 834-835). (Emphasis added throughout.)